

WHAT IS CLAIMED IS:

- 1 1. A nanofiber comprising a first polymer and a biological material,
2 wherein said nanofiber has a plurality of nanopores.
- 1 2. The nanofiber of claim 1, wherein said first polymer is a synthetic
2 polymer.
- 1 3. The nanofiber of claim 1, wherein said first polymer is a naturally
2 occurring polymer.
- 1 4. The nanofiber of claim 2, wherein said synthetic polymer is a member
2 selected from the group consisting of: poly(ethylene oxide), poly(vinyl alcohol),
3 poly(ethylene naphthalate), polyaniline, polyacrylic acid, polyacrylonitrile, polystyrene,
4 polymethylmethacrylate, poly(N-isopropylacrylamide), polyvinyl acetate, and derivatives
5 thereof.
- 1 5. The nanofiber of claim 3, wherein said naturally occurring polymer is a
2 member selected from the group consisting of: polysaccharides, polypeptides, cellulose,
3 poly-L-lactide, cellulose, casein, and derivatives thereof.
- 1 6. The nanofiber of claim 1, wherein said biological material and said
2 first polymer are present in a ratio of about 1:20 to about 20:1.
- 1 7. The nanofiber of claim 1, wherein said biological material and said
2 first polymer are present in a ratio of about 1:10 to about 10:1.
- 1 8. The nanofiber of claim 1, wherein said biological material and said
2 first polymer are present in a ratio of about 1:5 to about 5:1.
- 1 9. The nanofiber of claim 1, wherein said biological material and said
2 first polymer are present in a ratio of 1:4.
- 1 10. The nanofiber of claim 1, wherein said biological material is
2 covalently attached to said nanofiber via a linker.
- 1 11. The nanofiber of claim 10, wherein said linker is a member selected
2 from the group consisting of: polyethylene glycol (PEG), polyacrylic acid (PAA),

3 polyacrylamide (PAM) as non-ionic, and dimethylaminoethyl methacrylate (DMAEMA) or
4 combinations thereof.

1 12. The nanofiber of claim 1, wherein said nanofiber is about 50 nm to
2 about 1000 nm in diameter.

1 13. The nanofiber of claim 1, wherein said nanopores are about 5 nm to
2 about 500 nm in diameter.

1 14. The nanofiber of claim 1, wherein said nanopores are about 25 nm to
2 about 100 nm in diameter.

1 15. The nanofiber of claim 1, wherein said nanopores are about 5 nm to
2 about 25 nm in diameter.

1 16. The nanofiber of claim 1, wherein said nanopores are about 10 nm to
2 about 50 nm in diameter.

1 17. The nanofiber of claim 1, wherein said nanofiber is insoluble in an
2 aqueous solution.

1 18. The nanofiber of claim 1, wherein said nanofiber is insoluble in an
2 organic solution.

1 19. The nanofiber of claim 18, wherein said first polymer is crosslinked.

1 20. The nanofiber of claim 1, further comprising a second polymer.

1 21. The nanofiber of claim 20, wherein said first polymer and said second
2 polymer are present in a ratio of about 1:20 to about 20:1.

1 22. The nanofiber of claim 20, wherein said first polymer and said second
2 polymer are present in a ratio of about 1:10 to about 10:1.

1 23. The nanofiber of claim 20, wherein said first polymer and said second
2 polymer are present in a ratio of 4:1.

1 24. The nanofiber of claim 20, wherein said first polymer and said second
2 polymer are present in a ratio of 1:4.

1 25. The nanofiber of claim 20, wherein said first polymer and said second
2 polymer are present in a ratio of 1:1.

1 26. The nanofiber of claim 20, wherein said first polymer is a synthetic
2 organic polymer and said second polymer is a naturally occurring polymer.

1 27. The nanofiber of claim 1, wherein said biological material is a protein.

1 28. The nanofiber of claim 27, wherein said protein is a member selected
2 from the group consisting of: integral membrane proteins, structural proteins, intracellular
3 proteins, and enzymes.

1 29. The nanofiber of claim 26, wherein said synthetic organic polymer is a
2 member selected from the group consisting of: poly(ethylene oxide), poly(vinyl alcohol),
3 poly(ethylene naphthalate), polyaniline, polyacrylic acid, polyacrylon nitrile,
4 polysaccharides, cellulose, poly-L-lactide, polystyrene, polymethylmethacrylate, poly(N-
5 isopropylacrylamide), polyvinyl acetate and derivatives thereof, and said naturally occurring
6 polymer is a member selected from the group consisting of: polysaccharides, polypeptides,
7 cellulose, poly-L-lactide, cellulose, casein, and derivatives thereof.

1 30. The nanofiber of claim 28, wherein said protein is an enzyme.

1 31. The nanofiber of claim 30, wherein said enzyme is a member selected
2 from the group consisting of: a lipase, a carbohydrase, a DNase, and a protease.

1 32. A membrane comprising a nanofiber comprising a first polymer and a
2 biological material, wherein said nanofiber has a plurality of nanopores.

1 33. The membrane of claim 32, wherein said membrane is insoluble in an
2 aqueous solution.

1 34. The membrane of claim 32, wherein said membrane is insoluble in an
2 organic solution.

1 35. The membrane of claim 32, wherein said biological material is
2 attached to said membrane via a linker.

1 36. The membrane of claim 35, wherein said linker is PEG.

- 1 37. The membrane of claim 35, wherein said linker is PAA.
- 1 38. A fabric comprising a nanofiber comprising a first polymer and a
2 biological material, wherein said nanofiber has a plurality of nanopores.
- 1 39. The fabric of claim 38, wherein said biological material is attached to
2 said nanofiber via a linker.
- 1 40. The fabric of claim 38, wherein said linker is PEG.
- 1 41. The fabric of claim 38, wherein said linker is PAA.
- 1 42. An insoluble nanofiber comprising a polymer and a biological
2 material, wherein said nanofiber is insoluble in an aqueous solution.
- 1 43.. An insoluble nanofiber comprising a polymer and a biological
2 material, wherein said nanofiber is insoluble in an organic solution.
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